

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date  
10 June 2004 (10.06.2004)

PCT

(10) International Publication Number  
**WO 2004/048622 A1**

(51) International Patent Classification<sup>7</sup>: C22B 9/02,  
9/04, 34/12

Richard [US/US]; 5836 Sunrise Avenue, Clarendon Hills, IL 60514 (US). JACOBSEN, Lance [US/US]; 123 San Carlos Road, Minooka, IL 60447 (US).

(21) International Application Number:  
PCT/US2003/027649

(74) Agent: LEVY, Harry, M.; Emrich & Dithmar, 300 South Wacker Drive, Suite 3000, Chicago, IL 60606 (US).

(22) International Filing Date:  
3 September 2003 (03.09.2003)

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(25) Filing Language: English

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,

(26) Publication Language: English

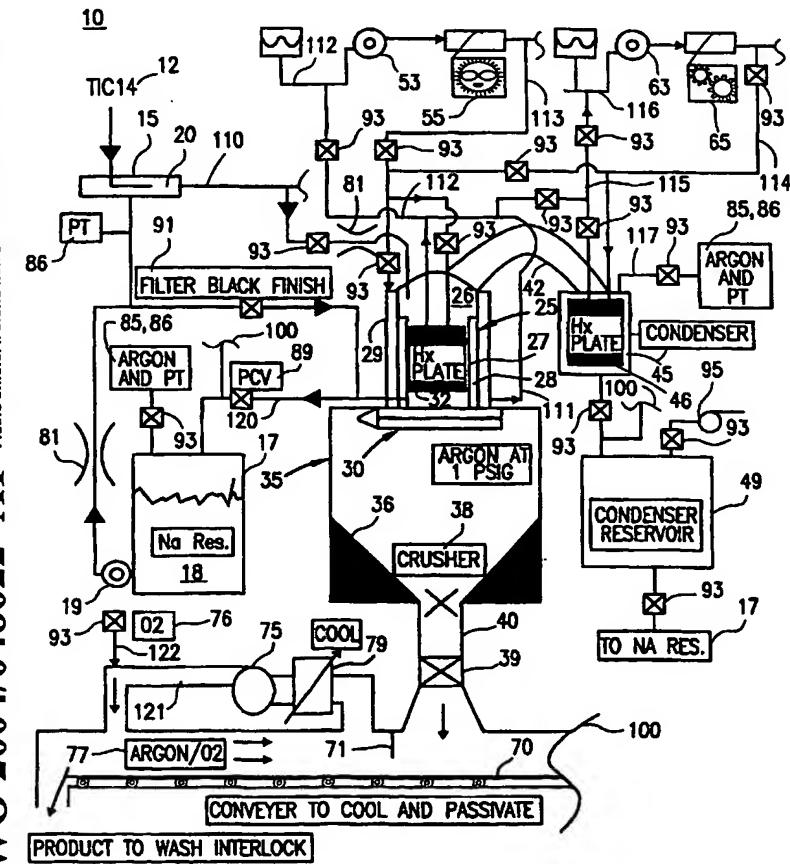
(30) Priority Data:  
60/427,728 20 November 2002 (20.11.2002) US

(71) Applicant (*for all designated States except US*): INTERNATIONAL TITANIUM POWDER, LLC. [US/US]; 20634 W. Gaskin Drive, Lockport, IL 60441 (US).

(72) Inventors; and  
(75) Inventors/Applicants (*for US only*): ANDERSON,

[Continued on next page]

(54) Title: SEPARATION SYSTEM OF METAL POWDER FROM SLURRY AND PROCESS



(57) Abstract: A system and method of separating metal powder from a slurry of liquid metal and metal powder and salt is disclosed in which the slurry is introduced into a first vessel operated in an inert environment when liquid metal is separated from the metal powder and salt leaving principally salt and metal powder substantially free of liquid metal. The salt and metal powder is transferred to a second vessel operated in an inert environment with both environments being protected from contamination. Then the salt and metal powder are treated to produce passivated powder substantially free of salt and liquid metal. The method is particularly applicable for use in the production of Ti and its alloys.

**WO 2004/048622 A1**



ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,  
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *with international search report*

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 03/27649

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 C22B9/02 C22B9/04 C22B34/12

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 C22B B01D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, COMPENDEX

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 409 797 B2 (ANDERSON RICHARD PAUL ET AL) 25 June 2002 (2002-06-25) cited in the application column 4, lines 24-29 and lines 49-55; column 7, lines 32-45	1,2, 4-10,14, 19,20 11,12
Y	US 4 379 718 A (GRANTHAM LEROY F ET AL) 12 April 1983 (1983-04-12) abstract; column 6, lines 32-46	11,12
A	US 3 867 515 A (BOHL LESTER E ET AL) 18 February 1975 (1975-02-18)	
A	US 5 437 854 A (WALKER ROY G ET AL) 1 August 1995 (1995-08-01)	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the International search

19 December 2003

Date of mailing of the International search report

02/01/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Bjoerk, P

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International	Application No
PCT/US 03/27649	

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6409797	B2	17-01-2002	US 5958106 A US 5779761 A US 2002005090 A1 US 2002148327 A1 US 2002152844 A1 US 2003145682 A1 US 2003061907 A1 AU 686444 B2 AU 3320195 A BR 9508497 A CA 2196534 A1 CN 1161064 A ,B DE 69521432 D1 DE 69521432 T2 EP 0777753 A1 ES 2161297 T3 JP 10502418 T JP 3391461 B2 KR 241134 B1 NO 970444 A RU 2152449 C1 WO 9604407 A1	28-09-1999 14-07-1998 17-01-2002 17-10-2002 24-10-2002 07-08-2003 03-04-2003 05-02-1998 04-03-1996 23-12-1997 15-02-1996 01-10-1997 26-07-2001 29-05-2002 11-06-1997 01-12-2001 03-03-1998 31-03-2003 02-03-2000 26-03-1997 10-07-2000 15-02-1996
US 4379718	A	12-04-1983	AU 543753 B2 AU 8346582 A CA 1193447 A1 JP 1716294 C JP 3080854 B JP 57194220 A	02-05-1985 25-11-1982 17-09-1985 27-11-1992 26-12-1991 29-11-1982
US 3867515	A	18-02-1975	NONE	
US 5437854	A	01-08-1995	NONE	